

Specification

1. Title of the Invention

METHOD FOR IMPROVING MEAT QUALITY OF FISH MEAT

2. What is Claimed is:

1. A method for improving the meat quality of fish meat, comprising:
 - adding 0.1 to 10%, relative to a weight of fish meat, of a single compound or a combination thereof selected from the group consisting of sodium phosphate, sodium bicarbonate, sodium citrate, and sucrose fatty acid esters to fillets, slices, or small pieces of fish meat,
 - further adding 0.01 to 1% of ascorbic acid if necessary,
 - allowing the fish meat to stand in these compounds for a given period of time,
 - adjusting a pH to between 6 and 8, and then
 - allowing the fish meat to age.

3. Detailed Description of the Invention

An objective of the present invention is to suppress peculiar odors that occur in common fish types, for example Alaska pollack, hoki, white croaker, and cod, which are common types of white fish, and mackerel, sardine, bonito, and tuna, which are common types of red fish. Specifically, the present invention relates to a method for suppressing a sourness that is generally disliked by consumers and peculiar odor of fish that exhibit a strong sour flavor and raw taste/odor (blood smell), such as mackerel, sardines, bonito, and tuna and simultaneously suppressing severe thermal coagulation, which often occurs when the fish are heat treated.

In recent years, large quantities of fish meat have come to be consumed by binding lumps of fish meat together or using loins for fish steaks or patties. In addition, large quantities of steaks and patties of bonito, mackerel, tuna, and cod have come to be used as such raw materials. However, such raw materials can exhibit a strong acidity depending on the type of fish and, when subjected to heat treatment, coagulate excessively to produce hard fish meat having a peculiar odor, which is generally not liked by consumers.

Flavorings such as pepper, laurel, garlic, and ginger were used in the past in order merely to suppress these odors. However, using large quantities of these flavorings causes the problem of the original fish flavor being lost and does not bring about a significant improvement in the hardness of the fish meat.

The inventors of the present invention investigated a variety of methods for suppressing the occurrence of peculiar odors and coagulation in fish meat or processed products thereof without losing the inherent flavor of the fish, and found that by bringing these types of fish into contact with a mixture of sodium phosphate, sodium bicarbonate, sodium citrate, and a sucrose fatty acid ester, it was possible to almost completely eliminate peculiar odors and fish meat hardness caused by thermal coagulation during heat treatment without losing the inherent flavor of the fish.

The method for carrying out the present invention involves either immersing the fish in an aqueous solution of the mixture or bringing the fish into contact with a powder of the mixture in a mixer and the like. After being brought into contact with the mixture, the fish is pickled or allowed to stand at a low temperature for a prescribed period of time. By carrying out such a processing step, it is possible to process the fish without losing the softness or flavor of the fish meat.

Working example 1

A raw material meat (pH 5.6) obtained by defrosting frozen bonito loin in a cold room was blended in a mixer with a homogeneous mixture of 0.4 wt.% of sodium bicarbonate, 0.25 wt.% of sodium phosphate (a mixture of 50% of sodium polyphosphate and 50% of sodium pyrophosphate), 0.15 wt.% of sodium citrate, 0.5 wt.% of a sucrose fatty acid ester, and 0.3 wt.% of sodium L-ascorbate over a period of 1 minute and 30 seconds at a temperature of 5°C in such a way as not to cause the fish to disintegrate, and allowed to stand in a room at a temperature of 5°C for 16 hours. The raw material was adjusted to a pH of 7.1, frozen and prepared as "tataki" (seared fish) by grilling the surface of the fish with a gas flame. Meanwhile, as a control, defrosted bonito loin was prepared as "tataki" by grilling the surface of the fish with a gas flame and evaluated in a comparative panel test.

The results are shown in table 1.

Table 1

Material	Test item	Fibrous feeling	Softness	Peculiar odor	Flavor	Oral sensation	Color	Sourness
Control		+++	+	-	-	-	++	-
Present invention method		+++	+++	+++	+++	+++	+++	+++

Note: The panel test was carried out by 10 male and 10 female panellists, with poor being denoted by "-" and good denoted by "+".

As can be seen from table 1, extremely good results were obtained from seared bonito "tataki" processed using the method of the present invention. The method of the present invention was superior to the control in terms of meat softness, suppression of peculiar odors, flavor, oral sensation, and sourness.

Working example 2

A raw material meat (pH 5.4) obtained by removing the skin and abdominal meat from 3 fillets obtained by removing the head and internal organs from mackerel was blended in a mixer with a homogeneous mixture of 0.5 wt.% of sodium bicarbonate, 0.35 wt.% of sodium phosphate (a mixture of 50% of sodium polyphosphate and 50% of sodium pyrophosphate), 0.15 wt.% of sodium citrate, and 0.5 wt.% of a sucrose fatty acid ester over a period of 1 minute at a temperature of 5°C in such a way as not to cause the fish to disintegrate, and allowed to stand in a room at a temperature of 5°C for 16 hours. The raw material was adjusted to a pH of 7.2 and formed into steaks packed in casings by a retainer by means of a stuffer using a binder. Meanwhile, as a control, a mackerel steak was prepared by forming mackerel into a steak packed in a casing by a retainer by means of a stuffer using a binder, freezing, and slicing into thicknesses of 12 mm using a band saw, and then subjected to a mackerel steak comparison test.

The results are shown in table 2.

Table 2

Material	Test item	Fibrous feeling	Softness	Peculiar odor	Flavor	Oral sensation
Control		+++	-	-	-	--
Present invention method		+++	+++	+++	+++	+++

Note: The panel test was carried out by 10 male and 10 female panelists, with poor being denoted by "--" and good denoted by "+".

As can be seen from table 2, the mackerel steak processed using the method of the present invention achieved clearly superior results to the control product, thus demonstrating that the method of the present invention is significantly superior.

Working example 3

A raw material meat (pH 5.8) obtained by defrosting frozen yellowfin tuna meat in a cold room at a temperature of 5°C and then cutting into 3 to 5 cm pieces was blended in a mixer with a homogeneous mixture of 0.3 wt.% of sodium bicarbonate, 0.25 wt.% of sodium phosphate (a mixture of 50% of sodium polyphosphate and 50% of sodium pyrophosphate), 0.25 wt.% of sodium citrate, 0.3 wt.% of a sucrose fatty acid ester, 0.3 wt.% of sodium L-ascorbate, and 1.5 wt.% of table salt over a period of 2 minutes at a temperature of 5°C in such a way as not to cause the fish to disintegrate, and allowed to stand in a room at a temperature of 5°C for 5 hours. The raw material meat was adjusted to a pH of 6.8 and formed into steaks. Meanwhile, as a control, tuna meat was sliced into thicknesses of 1.5 cm shallow fried in a frying pan coated with oil, and then subjected to a comparison test.

The results are shown in table 3.

Table 3

Material	Test item	Fibrous feeling	Softness	Peculiar odor	Hardness	Flavor	Sourness
Control		++	++	-	--	--	--
Present invention method		+++	+++	+++	+++	+++	+++

Note: The panel test was carried out by 10 male and 10 female panelists, with poor being denoted by "..." and good denoted by "+".

As can be seen from table 3, fish processed using the method of the present invention achieved significantly better meat quality than the raw material, which took on a sour flavor.